UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte
ROBERT B. DICKSON, CHEN-YONG LIN, MICHAEL JOHNSON, SHAOMENG WANG, and ISTVAN ENYEDY

Appeal 2007-4125
Application 09/936,333
Technology Center 1600

Decided: November 5, 2007

Before DONALD E. ADAMS, DEMETRA J. MILLS, and RICHARD M. LEBOVITZ, *Administrative Patent Judges*.

LEBOVITZ, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal from the Examiner's final rejection of claims 16, 18, and 34-36. We have jurisdiction under 35 U.S.C. § 6(b). We reverse.

STATEMENT OF THE CASE

The claims are directed to antibodies which selectively bind with higher affinity to two-chain human matriptase than to single-chain human matriptase. Matriptase is a protease, originally identified on human breast cancer cells, which has been proposed to play a role in the metastatic invasiveness of breast cancer cells (Specification 3).

Claims 15, 16, 18, 19, and 34-36 are pending (Appeal Br. 3). Claims 15 and 19 are allowed (Appeal Br. 3). The sole rejection on appeal in this proceeding is the rejection of claim 16, 18, and 34-36 under 35 U.S.C. § 112, first paragraph, as containing subject matter which is not described in the Specification (Answer 3).

We focus on claim 16, the only independent claim. Claim 16 reads as follows:

> 16. An isolated antibody or immunologically reactive fragment thereof which selectively binds with greater affinity to a two-chain (active) form of matriptase of a human than to a single-chain (zymogen) form of matriptase of said human.

ISSUE ON APPEAL

The Examiner contends that the claimed isolated antibody which "selectively binds with greater affinity" to a two-chain human matriptase than a single-chain human matriptase lacks written description under 35 U.S.C. § 112, first paragraph, because the Specification does not identify the structure or epitopes present in the two-chain form which are absent from the single-chain form (Answer 5).

Appellants contend that "an application that describes and fully characterizes an antigenic protein in structural and chemical terms satisfies the written description requirement . . . with respect to claims directed to antibodies that bind specifically to the characterized antigenic protein" (Appeal Br. 10).

The sole issue in this appeal is what must be described in the Specification to meet the written description requirement of 35 U.S.C. § 112, first paragraph, for a claim to an isolated antibody "which selectively

binds with greater affinity to" a two-chain human matriptase than to a single-chain human matriptase.

FINDINGS OF FACT

1. Human matriptase is a serine protease with a broad spectrum proteolytic activity (Specification 3)

2. Its complete amino acid sequence is shown in Fig. 9 to have 683 amino acids (Specification 10).

3. Matriptase contains conserved amino acid motifs which are characteristic of archetype serine proteases (Specification 65).

4. His-484, Asp-539, and Ser-633 comprise the putative catalytic triad (Specification 65).

5. Matriptase is synthesized as an inactive single-chain protein (a "zymogen") which is cleaved at amino acid position 442 (Arg-442) to form the catalytic two-chain form (Specification 66-67; 77-78; *see* Appeal Br. 10). The sequence of each chain is known.

6. The two-chains are held together by intramolecular disulfide bonds between cysteine residues (Specification 66: 23 to 67: 3).

7. Fig. 14 shows the structure of the single-chain and two-chain forms of matriptase.

8. The two forms of matriptase can be distinguished in electrophoresis assays. "In this electrophoresis assay, proteins that contain multiple disulfide-bonded components are dissociated into the constituent components that appear on the same electrophoretic path. In contrast, single-chain proteins are not dissociated" (Specification 78: 1-4).

9. Two anti-matriptase monoclonal antibodies were isolated "which specifically recognize the two-chain matriptase, but not the single-chain

form" (Specification 89: 25 to 90: 1). The ability of the antibody to discriminate between the two physical forms was determined by Western blot analysis (Specification 14: 3-6: 89-91).

ANALYSIS

Claim 16 is directed to an isolated antibody, or a reactive fragment of it, which has the functional characteristic of selectively binding "with greater affinity to a two-chain (active) form of matriptase of a human than to a single-chain (zymogen) form." For antibody claims which are defined by their function, rather than the structure of the antibody, itself, the Federal Circuit has adopted the USPTO Guidelines

> as persuasive authority for the proposition that a claim directed to "any antibody which is capable of binding to antigen X" would have sufficient support in a written description that disclosed "fully characterized antigens." Synopsis of Application of Written Description Guidelines, at 60, available at http://www.uspto.gov/web/menu/written.pdf (last visited Jan. 16, 2003) (emphasis added).

Noelle v. Lederman, 355 F3d 1343, 1349, 69 USPQ2d 1508, 1513-14 (Fed. Cir. 2004); *see* also *Enzo Biochem Inc. v. Gen-Probe Inc.*, 323 F.3d 956, 964, 63 USPQ2d 1609, 1613 (Fed. Cir. 2002). Thus, "as long as an applicant has disclosed a 'fully characterized antigen,' either by its structure, formula, chemical name, or physical properties, or by depositing the protein in a public depository, the applicant can then claim an antibody by its binding affinity to that described antigen." *Noelle*, 355 F3d 1343, 1349, 69 USPQ2d 1508, 1514. In this case, the antibody of claim 16 is functionally claimed by its binding affinity to two antigens – single-chain and two-chain human matriptase. Consequently, we conclude that the Specification must

fully characterize each of the two antigens to meet the written description requirement for the claim.

The Examiner would impose the additional requirement that the Specification describe the structure or epitopes in the two-chain form which are absent in the single-chain form (Answer 5) in order to comply with the written description requirement. The Examiner reasons that the claims are genus claims because the claimed antibodies bind to a genus of structural determinants in the two-chain form which are not present in the single-chain form (Answer 5-6). Consequently, the Examiner contends that the Specification is deficient because without describing the structural epitopes which distinguish the antigens, there is "no certainty" as to what other antibodies could similarly distinguish between the two forms (Answer 5-6).

We do not agree with the Examiner's reasoning. According to the written description requirement of § 112, first paragraph, the "specification shall contain a written description of the invention." 35 U.S.C. § 112, ¶ 1. Thus, the determination of whether a specification complies with the written description requirement begins with what is claimed as the invention. Here, the invention is claimed as an antibody having greater affinity for two-chain human matriptase than for one-chain human matriptase. Therefore, what must be described by the Specification are the two matriptases which functionally define the antibody.

The invention is not claimed in terms of the antibody's ability to bind to particular structural epitopes present in two-chain human matriptase, but absent from single-chain human matriptase. Thus, there is no reason to require, as the Examiner does, the Specification to describe these structural epitopes; these are not part of the invention which is claimed.

Our position is consistent with the USPTO's *Synopsis of Application of Written Description Guidelines* referenced in *Noelle* and *Enzo* (*supra*). Example 16 of the *Guidelines* referred to a claim directed to an "isolated antibody capable of binding to antigen X" (*Guidelines*, at 59). Like the claim at issue in this appeal, Example 16 is drawn to a genus of antibodies that binding antigen X. The only identifying information in the application about the antigen was its molecular weight and "a clear protocol" by which it had been isolated (*Guidelines*, at 59). Yet, this information was considered sufficient to comply with § 112, first paragraph. The *Guidelines* do not additionally require the application to describe the structure or epitopes that made the antibody capable of binding antigen X because this is not the invention which is claimed. Likewise, we conclude that the Examiner erred in imposing this requirement for claim 16.

Therefore, we conclude that the Specification can meet the written description requirement for claim 16 by fully characterizing the single-chain and two-chain forms of human matriptase. To determine whether this requirement is met, we turn to the Specification.

The Specification provides the complete amino acid sequence of a single-chain human matriptase (Findings of Fact ("FF") 2). It contains the conserved amino acid amino acid motifs characteristic of serine proteases (FF 1, 3) and a corresponding catalytic site (FF 4). The single-chain form is inactive or a zymogen (FF 5). Its overall structure as a single chain is determined by its physical behavior in electrophoresis and by Western blot (FF 8, 9).

The Specification describes the structure of the catalytically active two chain, stating that it is produced by cleaving the single-chain form at

amino acid 442, resulting in two separate chains, each with a known sequence (FF 5). The chains are held together by disulfide bonds (FF 5-6) as shown in Fig. 14 (FF 7). It migrates differently in an electrophoresis assay and thus it can be physically distinguished from the single-chain form (FF 8, 9).

In sum, we find that the Specification characterizes the structure, function, and physical properties for each of the single- and two-chain forms of human matriptase to which the claimed antibody has binding affinity for, meeting the written description requirement of § 112, first paragraph, for claim 16. Accordingly, the rejection of claims 16, 18, and 34-36 is

REVERSED.

Ssc:

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